Search Report
EIC 1700

STIC Database Tracking Number

To: WAYNE LANGEL
Location: REM-9A29
Art Unit: 1793
Monday, April 07, 2008
Phone: (571) 272-1353
Case Serial Number: 10 / 588156

From: JAN DELAVAL
Location: EIC1700
REM-4B28 / REM-4A30
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Search Notes

Search and Information Resources Administration

Access DB# 255854

EIC 1700
SEARCH REQUEST

Scientific & Technical Information Center

Today's Date 3-31-08

Name Wayne Langel	Priority App. Filing Date 2-4-04
AU/Org. 1793 Examiner # 60603	Case/App. # 10/588156
Bld.&Rm.# ~~4B~~ E09A29 (Remsen) Phone 272-1353	**Format for Search Results** EMAIL __ PAPER C

If this is a Board of Appeals case, check here ☐

Synonyms

Describe this invention in your own words.

Terms to avoid

Additional Comments

Please search claims 1-18, as attached hereto. Note that claim 8 is specific as to the metals.

Please submit completed form to your EIC. SPE Signature here indicates Rush

****

STAFF USE ONLY

Searcher: Jan

Searcher Phone #:

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Date Searcher Picked Up: 4/7/08

Date Completed: 4/7/08

Searcher Prep & Review Time:

Clerical Prep Time: 30 +70

Online Time:

Type of Search

NA Sequence (#)

AA Sequence (#)

Structure (#) ✓

Bibliographic

Litigation

Fulltext

Patent Family

Other

Vendors and cost where applicable

STN ✓

Dialog

Questel/Orbit

Dr.Link

Lexis/Nexis

Sequence Systems

WWW/Internet

Other (specify)

PTO-1590 (8-01)

=> fil hcaplus
FILE 'HCAPLUS' ENTERED AT 10:05:46 ON 07 APR 2008

FILE COVERS 1907 - 7 Apr 2008 VOL 148 ISS 15
FILE LAST UPDATED: 6 Apr 2008 (20080406/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> => d bib abs hitind hitstr retable tot

L42 ANSWER 1 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 2005:811700 HCAPLUS
DN 143:196231
TI **Catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**
IN **Xiao, Tiancun**
PA **Isis Innovation Limited, UK**
SO PCT Int. Appl., 24 pp.
CODEN: PIXXD2
DT **Patent**
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005075342	A1	20050818	WO 2005-GB401	20050204 <--
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	EP 1711431	A1	20061018	EP 2005-708239	20050204 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK, IS				
	CN 1914116	A	20070214	CN 2005-80004024	20050204 <--
	JP 2007522068	T	20070809	JP 2006-551921	20050204 <--
	US 20070167532	A1	20070719	US 2006-588156	20060801 <--
PRAI	GB 2004-2487	A	20040204 <--		

WO 2005-GB401 W 20050204 <--

AB **Hydrogen** is produced by initiating a reaction between **methanol** and **hydrogen peroxide** in the presence of a **catalyst** at < 80°, preferably < 30°. The **catalyst** can contain **Ni**, **Co**, **Cu**, **Ag**, **Ir**, **Au**, **Pd**, **Ru**, **Rh**, or **Pt**, and a promoter. **CO** produced in the reforming process can be converted into **CO2** by water **gas** shift reaction in the presence of water. The process is carried out in a fuel cell, to power a rocket or to inflate an air bag, to pressurize mech. equipment, or for the quick start up of a **catalytic** exhaust **gas** converter or NOx purifier. The apparatus for carrying out the reforming reaction has storage means for **methanol** and **H2O2**, a housing containing the reforming **catalyst**, and means for introducing **methanol** and **H2O2** into the housing. Addnl., the housing contains a water **gas** shift **catalyst** located downstream of the reforming **catalyst**.

IC ICM C01B0003-32
ICS C01B0003-48; H01M0008-06
CC 49-1 (Industrial Inorganic Chemicals)
Section cross-reference(s): 52, 67
ST **hydrogen** manuf reforming **catalyst methanol** **hydrogen peroxide**; fuel cell **hydrogen** manuf **methanol hydrogen peroxide**

IT Fuel cells
Reforming **catalysts**
Water **gas** shift reaction
Water **gas** shift reaction **catalysts**
(**catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)

IT Fuel **gas** manufacturing
(reforming; **catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)

IT 1309-48-4, Magnesium oxide, uses 1313-13-9, Manganese oxide (MnO2), uses 1344-28-1, Alumina, uses
RL: CAT (Catalyst use); USES (Uses)
(**catalyst** support; **catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)

IT 1309-37-1, Iron oxide (Fe2O3), uses **7440-02-0**, **Nickel**, uses **7440-05-3**, **Palladium**, uses **7440-06-4**, **Platinum**, uses **7440-18-8**, Ruthenium, uses **7440-50-8**, **Copper**, uses 7440-66-6, Zinc, uses 12136-45-7, Potassium oxide, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(**catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)

IT **1333-74-0P**, **Hydrogen**, preparation
RL: CPS (Chemical process); **IMF (Industrial manufacture)**; PEP (Physical, engineering or chemical process); **PREP (Preparation)**; PROC (Process)
(**catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)

IT **67-56-1**, **Methanol**, reactions **7722-84-1**, **Hydrogen peroxide**, reactions
RL: **CPS (Chemical process)**; **PEP (Physical, engineering or chemical process)**; **RCT (Reactant)**; **PROC (Process)**; **RACT (Reactant or reagent)**
(**catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)

IT **7440-02-0, Nickel**, uses **7440-05-3, Palladium**, uses **7440-06-4, Platinum**, uses **7440-18-8**, Ruthenium, uses **7440-50-8, Copper**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(**catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)
RN 7440-02-0 HCAPLUS
CN Nickel (CA INDEX NAME)

Ni

RN 7440-05-3 HCAPLUS
CN Palladium (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS
CN Platinum (CA INDEX NAME)

Pt

RN 7440-18-8 HCAPLUS
CN Ruthenium (CA INDEX NAME)

Ru

RN 7440-50-8 HCAPLUS
CN Copper (CA INDEX NAME)

Cu

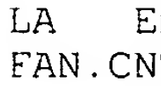
IT **1333-74-0P, Hydrogen**, preparation
RL: CPS (Chemical process); **IMF (Industrial manufacture)**; PEP (Physical, engineering or chemical process); **PREP (Preparation)**; PROC (Process)
(**catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)
RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)

H-H

IT **67-56-1, Methanol**, reactions **7722-84-1, Hydrogen peroxide**, reactions
RL: **CPS (Chemical process)**; **PEP (Physical, engineering or chemical process)**; **RCT (Reactant)**; **PROC (Process)**; **RACT (Reactant or reagent)**

(**catalytic** reaction between **methanol** and **hydrogen peroxide** to produce **hydrogen**)
RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)



RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Andreas, B	1971			US 3607066 A	HCAPLUS
Anon	2001	2000		PATENT ABSTRACTS OF	
Anon	2003	2003		PATENT ABSTRACTS OF	
Dreher, J	2003			WO 03051770 A	HCAPLUS
Mitsubishi Chemicals Co	2002			JP 2002343403 A	HCAPLUS
Toyoda Automatic Loom W	2001			JP 2001226102 A	HCAPLUS
Toyota Autom Loom Works	2001			JP 2001226102 A	HCAPLUS

L42 ANSWER 2 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 2005:696616 HCAPLUS
DN 143:176243
TI Fuel cell system
IN Vinsant, Brett D.
PA Quantum Leap Technology, Inc., USA
SO PCT Int. Appl., 94 pp.
CODEN: PIXXD2
DT **Patent**
LA English
FAN.CNT 5

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005069922	A2	20050804	WO 2005-US1618	20050119 <--
	WO 2005069922	A3	20050929		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
CN	1645661	A	20050727	CN 2004-10054511	20040722 <--
US	20060127708	A1	20060615	US 2005-323076	20051229 <--
US	20060134509	A1	20060622	US 2005-323047	20051229 <--
US	20060134503	A1	20060622	US 2005-323223	20051229 <--
US	20060134497	A1	20060622	US 2005-323510	20051229 <--
US	20060154134	A1	20060713	US 2005-323222	20051229 <--

	US 20060154133	A1	20060713	US 2005-322520	20051230 <--
	US 20070065709	A1	20070322	US 2005-322998	20051230 <--
	US 20060204828	A1	20060914	US 2006-356273	20060215 <--
	US 20070059583	A1	20070315	US 2006-555037	20060926 <--
PRAI	US 2004-538150P	P	20040120	<--	
	WO 2005-US1618	W	20050119		
	US 2005-555037	A2	20051027		
	US 2005-323047	A2	20051229		
	US 2005-323076	A2	20051229		
	US 2005-322520	A2	20051230		
	US 2005-754818P	P	20051230		
	US 2005-755023P	P	20051230		
	US 2006-555037	A2	20060926		

AB A fuel cell system includes multiple fuel cells. Each fuel cell may be a proton exchange membrane fuel cell that is arranged to optimize the performance of the fuel cell. The fuel cells may include silicon wafer substrates that define flow channels through the fuel cells for **hydrogen** and oxidant **gases**. The fuel cells can include obstructions within the flow channels that divert the flow of **gases** as the **gases** pass through the fuel cells. The fuel cell system may include multiple fuel cell modules, with each module including multiple stacked fuel cells.

IC ICM. H01M

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

IT **Catalysts**
(electrocatalysts; fuel cell system)

IT Honeycomb structures
Reforming **catalysts**
(fuel cell system)

IT Hydrocarbons, uses
Natural **gas**, uses
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fuel cell system)

IT Fuel **gas** manufacturing
(reforming; fuel cell system)

IT 1332-29-2, Tin oxide 1333-82-0, Chromium trioxide **7440-06-4**, **Platinum**, uses **7440-18-8**, Ruthenium, uses 7440-31-5, Tin, uses
RL: **CAT (Catalyst use); USES (Uses)**
(fuel cell system)

IT **630-08-0**, .Carbon monoxide, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(fuel cell system)

IT **67-56-1**, **Methanol**, uses 74-98-6, Propane, uses
RL: **CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)**
(fuel cell system)

IT **7440-50-8**, **Copper**, uses
RL: **DEV (Device component use); USES (Uses)**
(fuel cell system)

IT **124-38-9**, **Carbon dioxide**, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(fuel cell system)

IT **1333-74-0P**, **Hydrogen**, uses
RL: **SPN (Synthetic preparation)**; TEM (Technical or engineered

material use); **PREP (Preparation)**; USES (Uses)
(fuel cell system)

IT **7722-84-1, Hydrogen peroxide**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fuel cell system)

IT **7440-06-4, Platinum**, uses **7440-18-8**, Ruthenium, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(fuel cell system)

RN 7440-06-4 HCAPLUS
CN Platinum (CA INDEX NAME)

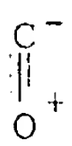
Pt

RN 7440-18-8 HCAPLUS
CN Ruthenium (CA INDEX NAME)

Ru

IT **630-08-0**, Carbon monoxide, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(fuel cell system)

RN 630-08-0 HCAPLUS
CN Carbon monoxide (CA INDEX NAME)



IT **67-56-1, Methanol**, uses
RL: **CPS (Chemical process)**; **PEP (Physical, engineering or chemical process)**; **TEM (Technical or engineered material use)**; **PROC (Process)**; **USES (Uses)**
(fuel cell system)

RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

IT **7440-50-8, Copper**, uses
RL: **DEV (Device component use)**; **USES (Uses)**
(fuel cell system)

RN 7440-50-8 HCAPLUS
CN Copper (CA INDEX NAME)

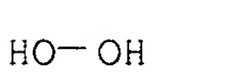
Cu

IT **124-38-9, Carbon dioxide**, formation
(nonpreparative)

RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(fuel cell system)
RN 124-38-9 HCAPLUS
CN Carbon dioxide (CA INDEX NAME)

IT **1333-74-0P, Hydrogen**, uses
RL: **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)
(fuel cell system)
RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)

IT **7722-84-1, Hydrogen peroxide**, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(fuel cell system)
RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)



L42 ANSWER 3 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 2005:123115 HCAPLUS
DN 142:222570
TI Hypergolic **hydrogen** generation system for fuel cell power plants
IN Barber, Jeffrey L.; Cronin, Jeremiah J.
PA Cbh2 Technologies, Inc., USA
SO U.S. Pat. Appl. Publ., 17 pp.
CODEN: USXXCO
DT **Patent**
LA English
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI US 20050031918	A1	20050210	US 2004-884771	20040701 <--
US 7344789	B2	20080318		
WO 2005015658	A2	20050217	WO 2004-US21359	20040701 <--
WO 2005015658	A3	20050915		
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
EP 1652257	A2	20060503	EP 2004-777481	20040701 <--

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, FI, RO, CY, TR, BG, CZ, EE, HU, PL, SK

CN 1833333 A 20060913 CN 2004-80022695 20040701 <--
JP 2007501998 T 20070201 JP 2006-522561 20040701 <--
PRAI US 2003-493871P P 20030807 <--
US 2003-503077P P 20030915 <--
WO 2004-US21359 W 20040701

AB The invention provides a controlled hypergolic approach to using concentrated **hydrogen peroxide** in combination with certain hydrocarbons such as ethanol, **methanol**, **methane** as well as more common fuels such as **gasoline**, diesel, DME, JP5, JP8 and the like to generate a **gas** mixture primarily composed of **hydrogen** and **carbon dioxide**. Because air is not used as the **oxygen** source, this novel process does not allow the formation of NOx compds., thereby avoiding the primary source of nitrogen contamination as well. The process is executed in a constraining system on a micro scale such that the resulting **hydrogen** supply is self-pressurizing. This enables the incorporation of an "on-demand" **hydrogen** fuel source for a variable output fuel cell power plant such as those proposed for use in automobiles, marine vessels and stationary power sources. In another embodiment of the present invention **hydrogen peroxide** is **catalytically**, or thermally reacted to provide H2O vapor and **O2**. When this **gaseous** stream is introduced to the cathode of the fuel cell, the percent concentration of **oxygen** is increased with no corresponding increase in the parasitic power demand made by an air-moving device. This use of **H2O2** as an **oxygen** source may be continuous, intermittent or limited to specific instances when peak power output demands or high transient loads are placed upon the FCPS.

IC ICM H01M0008-06
ICS H01M0008-04
INCL 429017000; 429022000; 429019000
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 49
ST hypergolic **hydrogen** generation system fuel cell power plant
IT **Catalysts**
Ceramic membranes
Diesel fuel
Jet aircraft fuel
Molecular sieves
(hypergolic **hydrogen** generation system for fuel cell power plants)
IT **Gasoline**
Hydrocarbons, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(hypergolic **hydrogen** generation system for fuel cell power plants)
IT Fuel cells
(power plants; hypergolic **hydrogen** generation system for fuel cell power plants)
IT Control apparatus
(pressure; hypergolic **hydrogen** generation system for fuel cell power plants)
IT Fuel cells
(proton exchange membrane; hypergolic **hydrogen** generation system for fuel cell power plants)
IT 1314-23-4, Zirconia, uses
RL: CAT (Catalyst use); USES (Uses)
(**Rh** supported on; hypergolic **hydrogen** generation

system for fuel cell power plants)
IT **7440-16-6, Rhodium**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(ZrO2-supported; hypergolic **hydrogen** generation system for fuel cell power plants)
IT 1306-38-3, Ceria, uses 7439-89-6, Iron, uses **7440-02-0, Nickel**, uses **7440-06-4, Platinum**, uses 7440-47-3, Chromium, uses **7440-48-4, Cobalt**, uses **7440-50-8, Copper**, uses 11113-58-9, **Cobalt** vanadium oxide 11129-89-8, **Platinum** oxide
RL: **CAT (Catalyst use)**; **USES (Uses)**
(hypergolic **hydrogen** generation system for fuel cell power plants)
IT 64-17-5, Ethanol, processes **67-56-1, Methanol**, processes **74-82-8, Methane**, processes 110-71-4 **7722-84-1, Hydrogen peroxide**, processes 7732-18-5, Water, processes
RL: **CPS (Chemical process)**; **PEP (Physical, engineering or chemical process)**; **PROC (Process)**
(hypergolic **hydrogen** generation system for fuel cell power plants)
IT **124-38-9, Carbon dioxide**, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(hypergolic **hydrogen** generation system for fuel cell power plants)
IT **1333-74-0P, Hydrogen**, uses
RL: **SPN (Synthetic preparation)**; TEM (Technical or engineered material use); **PREP (Preparation)**; USES (Uses)
(hypergolic **hydrogen** generation system for fuel cell power plants)
IT **7440-16-6, Rhodium**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(ZrO2-supported; hypergolic **hydrogen** generation system for fuel cell power plants)
RN 7440-16-6 HCAPLUS
CN Rhodium (CA INDEX NAME)

Rh

IT **7440-02-0, Nickel**, uses **7440-06-4, Platinum**, uses **7440-48-4, Cobalt**, uses **7440-50-8, Copper**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(hypergolic **hydrogen** generation system for fuel cell power plants)
RN 7440-02-0 HCAPLUS
CN Nickel (CA INDEX NAME)

Ni

RN 7440-06-4 HCAPLUS
CN Platinum (CA INDEX NAME)

Pt

RN 7440-48-4 HCAPLUS
CN Cobalt (CA INDEX NAME)

Co

RN 7440-50-8 HCAPLUS
CN Copper (CA INDEX NAME)

Cu

IT **67-56-1, Methanol**, processes **74-82-8, Methane**, processes **7722-84-1, Hydrogen peroxide**, processes
RL: **CPS (Chemical process)**; **PEP (Physical, engineering or chemical process)**; **PROC (Process)**
(hypergolic **hydrogen** generation system for fuel cell power plants)
RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

H_3C-OH

RN 74-82-8 HCAPLUS
CN Methane (CA INDEX NAME)

CH_4

RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)

$HO-OH$

IT **124-38-9, Carbon dioxide**, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(hypergolic **hydrogen** generation system for fuel cell power plants)
RN 124-38-9 HCAPLUS
CN Carbon dioxide (CA INDEX NAME)

$O=C=O$

IT **1333-74-0P, Hydrogen**, uses
RL: **SPN (Synthetic preparation)**; TEM (Technical or engineered

material use); **PREP (Preparation)**; USES (Uses)
(hypergolic **hydrogen** generation system for fuel cell power plants)
RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)

H - H

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
Adams	1999			US 6007930 A	HCAPLUS
Anon				Hydrogen peroxide co	
Anon				New Device Lets Fuel	
Basch	1971			US 3607066 A	HCAPLUS
Brauchle	2002			US 6495276 B1	HCAPLUS
Center for Environmenta	2001			Advanced Separations	
Frolov				The Analysis of Poss	
Fronk	2002			US 6497970 B1	HCAPLUS
Geissler				Kinetics and systems	
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Wellington	2003			US 20030213594 A1	

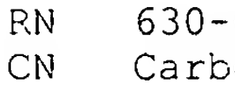
L42 ANSWER 4 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 2004:795121 HCAPLUS
DN 142:413246
TI Conversion of **methanol** in the presence of heterogeneous carbon-supported **catalysts**
AU Trusov, A. I.; Egorova, E. V.; Antonyuk, S. N.; Nugmanov, E. R.
CS Russia
SO Uchenye Zapiski MITKhT (**2003**), 9, 40-44
CODEN: UZMCAL; ISSN: 0201-7113

PB MITKhT im. M. V. Lomonosova
DT Journal
LA Russian
OS CASREACT 142:413246
AB Conversion of **methanol** was investigated at 200-400° on heterogeneous **catalysts** supported on activated carbon SKT, composite carbon material Sibunit, and metal-free carbon fibers. The supports were mostly inactive in the above temperature range with exception of the activated carbon SKT, which showed a **methanol** conversion of 8% at 400° with formation of di-Me ether. The supported **copper catalysts** were prepared and used for dehydrogenation of **methanol** with production of Me formate. The highest selectivity showed **copper catalysts** containing 5% of **copper** supported on Sibunit and treated with a 10%-aqueous solution of **hydrogen peroxide** (selectivity 77.0%, conversion 10.1%, 200°) or a 10%-aqueous solution of nitric acid (selectivity 82.6%, conversion 9.7%, 200°).
CC 45-4 (Industrial Organic Chemicals, Leather, Fats, and Waxes)
Section cross-reference(s): 67
ST carbon supported **catalyst methanol** dehydrogenation methyl formate prodn
IT **Catalyst** supports
Dehydrogenation
Dehydrogenation **catalysts**
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT Carbon fibers, uses
RL: CAT (Catalyst use); USES (Uses)
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT 7440-44-0, Carbon, uses
RL: CAT (Catalyst use); USES (Uses)
(activated, SKT and Sibunit; dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT 7697-37-2, Nitric acid, uses **7722-84-1, Hydrogen peroxide**, uses
RL: CAT (Catalyst use); USES (Uses)
(carbon-supported **copper catalysts** treated with; dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT **74-82-8P, Methane**, preparation 115-10-6P, Dimethyl ether **124-38-9P, Carbon dioxide**, preparation **630-08-0P**, Carbon monoxide, preparation **1333-74-0P, Hydrogen**, preparation 7732-18-5P, Water, preparation
RL: **BYP (Byproduct); PREP (Preparation)**
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT **7440-50-8, Copper**, uses
RL: **CAT (Catalyst use); USES (Uses)**
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT **67-56-1, Methanol**, reactions
RL: **RCT (Reactant); RACT (Reactant or reagent)**
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT 107-31-3P, Methyl formate
RL: SPN (Synthetic preparation); PREP (Preparation)
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
IT **7722-84-1, Hydrogen peroxide**, uses

RL: CAT (Catalyst use); USES (Uses)
(carbon-supported **copper catalysts** treated with; dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)

IT **74-82-8P, Methane**, preparation **124-38-9P, Carbon dioxide**, preparation **630-08-0P**, Carbon monoxide, preparation **1333-74-0P, Hydrogen**, preparation
RL: **BYP (Byproduct); PREP (Preparation)**
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
RN 74-82-8 HCAPLUS
CN Methane (CA INDEX NAME)

RN 124-38-9 HCAPLUS
CN Carbon dioxide (CA INDEX NAME)



RN 630-08-0 HCAPLUS
CN Carbon monoxide (CA INDEX NAME)

RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)

IT **7440-50-8, Copper**, uses
RL: **CAT (Catalyst use); USES (Uses)**
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
RN 7440-50-8 HCAPLUS
CN Copper (CA INDEX NAME)

Cu

IT **67-56-1, Methanol**, reactions

RL: **RCT (Reactant)**; **RACT (Reactant or reagent)**
(dehydrogenation of **methanol** on heterogeneous carbon-supported **catalysts**)
RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

L42 ANSWER 5 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 2003:697772 HCAPLUS
DN 140:130713
TI **Methanol** and **hydrogen** from **methane**, water, and light
AU Taylor, Charles E.
CS National Energy Technology Laboratory, U.S. Department of Energy, Pittsburgh, PA, 15236-0940, USA
SO Preprints of Symposia - American Chemical Society, Division of Fuel Chemistry (**2003**), 48(2), 876-878
CODEN: PSADFZ; ISSN: 1521-4648
PB American Chemical Society, Division of Fuel Chemistry
DT Journal; (computer optical disk)
LA English
AB Photocatalyst and electron-transfer reagent were used to convert **methane** and water in **methane** hydrates to **methanol** and **hydrogen**. Products of conversion at atmospheric pressure and 10.1 MPa were similar. Under the conditions used in the 1 MPa expts., the photocatalytic reaction produced 1.7 g of **methanol** -per gram of **catalyst** per h in the steady state mode and produced 43 g of **methanol** per g of **catalyst** per h when **hydrogen peroxide** solution was added. In all expts., conversion of **methane** and the production of **methanol** were augmented by the addition of **hydrogen peroxide** solution, consistent with the postulated mechanism that invokes a hydroxyl radical as an intermediate in the reaction sequence. The use of other radical initiators would be of interest to determine if the enhanced conversion could be sustained.
CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 67, 74
ST **methane** water photocatalytic hydrate **methanol** **hydrogen**
IT **Catalysts**
(photochem.; photocatalytic conversion of **methane** to **methanol** and **hydrogen** in presence of **methane** hydrates)
IT 1314-35-8, Tungsten oxide (WO3), uses 7439-91-0, Lanthanum, uses **7440-06-4**, **Platinum**, uses **7440-50-8**, **Copper**, uses 13463-67-7, Titania, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(photocatalytic conversion of **methane** to **methanol** and **hydrogen** in presence of **methane** hydrates)
IT **67-56-1P**, **Methanol**, preparation **1333-74-0P**, **Hydrogen**, preparation
RL: **IMF (Industrial manufacture)**; **PREP (Preparation)**
(photocatalytic conversion of **methane** to **methanol** and **hydrogen** in presence of **methane** hydrates)
IT **74-82-8**, **Methane**, reactions **7722-84-1**, **Hydrogen peroxide**, reactions 7732-18-5, Water,

reactions 14476-19-8, **Methane** hydrate
RL: **RCT (Reactant)**; **RACT (Reactant or reagent)**
(photocatalytic conversion of **methane** to **methanol** and **hydrogen** in presence of **methane** hydrates)
IT **7440-06-4**, **Platinum**, uses **7440-50-8**, **Copper**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(photocatalytic conversion of **methane** to **methanol** and **hydrogen** in presence of **methane** hydrates)
RN 7440-06-4 HCAPLUS
CN Platinum (CA INDEX NAME)

Pt

RN 7440-50-8 HCAPLUS
CN Copper (CA INDEX NAME)

Cu

IT **67-56-1P**, **Methanol**, preparation **1333-74-0P**, **Hydrogen**, preparation
RL: **IMF (Industrial manufacture)**; **PREP (Preparation)**
(photocatalytic conversion of **methane** to **methanol** and **hydrogen** in presence of **methane** hydrates)
RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

H_3C-OH

RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)

H—H

IT **74-82-8**, **Methane**, reactions **7722-84-1**, **Hydrogen peroxide**, reactions
RL: **RCT (Reactant)**; **RACT (Reactant or reagent)**
(photocatalytic conversion of **methane** to **methanol** and **hydrogen** in presence of **methane** hydrates)
RN 74-82-8 HCAPLUS
CN Methane (CA INDEX NAME)

CH_4

RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)

HO—OH

RETABLE

Referenced Author (RAU)	Year (RPY)	VOL (RVL)	PG (RPG)	Referenced Work (RWK)	Referenced File
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L42 ANSWER 6 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 2003:511570 HCAPLUS
DN 139:56993
TI Power generator with integrated **oxygen** generator and **carbon dioxide** disposal system
IN Delaney, Michael E.; Elledge, Thomas H., Jr.
PA Anteon Corporation, USA
SO PCT Int. Appl., 37 pp.
CODEN: PIXXD2
DT **Patent**
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003054508	A2	20030703	WO 2002-US33479	20021022 <--
	WO 2003054508	A3	20040311		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	AU 2002365135	A1	20030709	AU 2002-365135	20021022 <--
	US 20050031522	A1	20050210	US 2004-493481	20040423 <--
PRAI	US 2001-330466P	P	20011023 <--		
	WO 2002-US33479	W	20021022 <--		

AB A power generator for generating power or electricity is equipped with an **oxygen** generator and a **carbon dioxide** absorber and consists of a tank containing an aqueous solution of a permanganate salt and **H2O2**, a **catalyst** in contact with the aqueous solution to **catalyze** their reaction to form **oxygen** and Mn(II) ions, a **carbon dioxide** inlet provided with a diffusor or atomizer and an **oxygen gas** outlet. The **CO2** reacts with the Mn(II) ions to form an insol. carbonate which is an efficient means to store waste **CO2**. Other cations capable of reacting with **CO2** to form an insol. carbonate, such as Ca, Ba, Mg, **Ag**, Sr, **Co**, **Ni**, Cd, **Cu**, Fe, or Pb, may also be added to the solution The tank is made of PTFE and carbon fiber. The **catalyst** can be Fe, **Cu**, **Pt**, or **Ni**, preferably deposited on a perforated plate. The power generator can be a turbine, a fuel cell, an internal combustion engine, or a heat powered engine, such as a Brayton cycle engine or a Sterling

engine. The power generator is equipped with a reformer to convert a hydrocarbon, such as diesel fuel, **methanol**, fuel oil, ethanol, or **gasoline**, into **H2** and **CO2**. The reformer is coupled with the **CO2** inlet of the absorber, thus introducing a mixture of **H2** and **CO2** into the absorber whereby the **H2** leaves the device unreacted through a **H2 gas** outlet equipped with a membrane selectively permeable for **H2**. The aqueous solution can contain cations capable of forming insol. sulfur salts in the form of sulfides, sulfates, or sulfites. The fuel cell is a proton exchange membrane (PEM) fuel cell with cathode fluidly coupled to the **oxygen** outlet and an anode fluidly connected with the **hydrogen** outlet of the absorber.

IC ICM G01N

CC 59-3 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 51, 52, 67

ST power generator **oxygen** generation waste **carbon dioxide** absorption carbonate; hydrocarbon reforming PEM fuel cell **oxygen** redox **catalyst**; **oxygen** generation **hydrogen peroxide** permanganate **catalyst** fuel cell power

IT Fuel cells
(PEM; power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT Air pollution
(**carbon dioxide**; power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT Absorption apparatus
Desulfurization
Diesel fuel
Exhaust **gases** (engine)
Fuel oil
Internal combustion engines
Petroleum reforming
Power generation
Redox reaction **catalysts**
Turbines
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT Sulfates, processes
Sulfides, processes
Sulfites
RL: CPS (Chemical process); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); FORM (Formation, nonpreparative); PROC (Process)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT Carbon fibers, uses
Fluoropolymers, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT Carbonates, formation (nonpreparative)
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT **Gasoline**
RL: RCT (Reactant); RACT (Reactant or reagent)
(power generator with integrated **oxygen** generator and

carbon dioxide disposal system)

IT Fuel **gas** manufacturing
(reforming; power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT **7440-06-4, Platinum**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT 7439-89-6, Iron, reactions **7440-02-0, Nickel**, reactions **7440-50-8, Copper**, reactions
RL: **CAT (Catalyst use)**; **RCT (Reactant)**; **RACT (Reactant or reagent)**; **USES (Uses)**
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT **124-38-9, Carbon dioxide**, processes
RL: CPS (Chemical process); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); POL (Pollutant); REM (Removal or disposal); FORM (Formation, nonpreparative); OCCU (Occurrence); PROC (Process)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT 7783-06-4, **Hydrogen** sulfide, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); POL (Pollutant); REM (Removal or disposal); OCCU (Occurrence); PROC (Process)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT 9002-84-0, PTFE
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT 471-34-1, Calcium carbonate, formation (nonpreparative) 598-62-9, Manganese carbonate
RL: FMU (Formation, unclassified); FORM (Formation, nonpreparative)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT **1333-74-0P, Hydrogen**, uses **7782-44-7P, Oxygen**, uses
RL: NUU (Other use, unclassified); **SPN (Synthetic preparation)**; **PREP (Preparation)**; USES (Uses)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT 64-17-5, Ethanol, reactions **67-56-1, Methanol**, reactions 7439-92-1, Lead, reactions 7439-95-4, Magnesium, reactions **7440-22-4, Silver**, reactions 7440-24-6, Strontium, reactions 7440-39-3, Barium, reactions 7440-43-9, Cadmium, reactions **7440-48-4, Cobalt**, reactions **7722-84-1, Hydrogen peroxide**, reactions 14333-13-2, Permanganate
RL: **RCT (Reactant)**; **RACT (Reactant or reagent)**
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

IT **7440-06-4, Platinum**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)

RN 7440-06-4 HCAPLUS
CN Platinum (CA INDEX NAME)

Pt

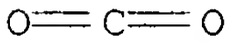
IT **7440-02-0, Nickel**, reactions **7440-50-8, Copper**, reactions
RL: **CAT (Catalyst use)**; **RCT (Reactant)**; **RACT (Reactant or reagent)**; **USES (Uses)**
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)
RN 7440-02-0 HCAPLUS
CN Nickel (CA INDEX NAME)

Ni

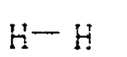
RN 7440-50-8 HCAPLUS
CN Copper (CA INDEX NAME)

Cu

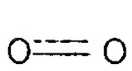
IT **124-38-9, Carbon dioxide**, processes
RL: CPS (Chemical process); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); POL (Pollutant); REM (Removal or disposal); FORM (Formation, nonpreparative); OCCU (Occurrence); PROC (Process)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)
RN 124-38-9 HCAPLUS
CN Carbon dioxide (CA INDEX NAME)



IT **1333-74-0P, Hydrogen**, uses **7782-44-7P, Oxygen**, uses
RL: NUU (Other use, unclassified); **SPN (Synthetic preparation)**; **PREP (Preparation)**; USES (Uses)
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)
RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)



RN 7782-44-7 HCAPLUS
CN Oxygen (CA INDEX NAME)



IT **67-56-1, Methanol**, reactions **7440-22-4, Silver**, reactions **7440-48-4, Cobalt**, reactions **7722-84-1, Hydrogen peroxide**, reactions

RL: **RCT (Reactant)**; **RACT (Reactant or reagent)**
(power generator with integrated **oxygen** generator and **carbon dioxide** disposal system)
RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

RN 7440-22-4 HCAPLUS
CN Silver (CA INDEX NAME)

RN 7440-48-4 HCAPLUS
CN Cobalt (CA INDEX NAME)

RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)

L42 ANSWER 7 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 1998:236628 HCAPLUS
DN 128:288423
TI Metal (oxide)-supporting layered structure substance as photolysis **catalyst** and its manufacture
IN Arima, Momoko; Yamashita, Hiroichi; Yoshida, Kiyoe; Kakinohana, Makoto; Domen, Issei
PA Riken Corp., Japan; Kakinohana, Makoto
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT **Patent**
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 10099694	A	19980421	JP 1996-280240	19961001 <--
PRAI	JP 1996-280240		19961001 <--		

AB The claimed photolysis **catalyst**, having ≥1 selected from **Ni**, **Pt**, **Ir**, **Ru**, and their oxides supported by a layered structure substance containing alkali metals and Group VB elements, is manufactured by (1) dissolving (a) ≥1 selected from alkoxides and (in)organic acid salts of Group VB element, (b) ≥1 ligands selected from carboxylic acids, acetylacetone, diamines, and pyridines, and (c) ≥1 selected from alkali metal alkoxides and (in)organic acid salts in ≥1 solvents selected from water, **H2O2**, monovalent alcs., and polyols, (2) esterifying of the components by heating the resulting solution at 353-423 K, (3) removing excess solvents or organic components from the resulting gel by heating at

≤620K, (4) heating of the gel at 600-800 K, (5) crushing of the resulting precursor, (6) heating of the resulting powder at 773-1200 K, and (7) applying 0.1-5 weight% ≥1 selected from **Ni**, **Pt**, **Ir**, **Ru**, and their oxides on the resulting layered structure substance powder. The **catalyst** is useful for manufacture of H from H2O by utilizing light energy.

IC ICM B01J0035-02
ICS B01J0023-20; B01J0023-648; B01J0023-847; C01B0003-02

CC 74-13 (Radiation Chemistry, Photochemistry, and Photographic and Other Reprographic Processes)

ST photolysis **catalyst** layered structure substance; metal oxide supporting layered structure substance; water photolysis **hydrogen** manuf

IT Photolysis **catalysts**
(metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst**)

IT Ligands
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(used in manufacture of metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst**
)

IT **7722-84-1**, **Hydrogen peroxide**, uses
RL: NUU (Other use, unclassified); USES (Uses)
(aqueous, solvent; in manufacture of metal (oxide)-supporting layered structure
substance containing alkali metal and Group VB element as photolysis **catalyst**)

IT 584-08-7, Potassium carbonate 10026-12-7, Niobium chloride (NbCl5)
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(for metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst**)

IT 12142-45-9, Niobium potassium oxide (Nb6K4O17)
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(layered structure; metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst**)

IT 50-21-5, Lactic acid, processes 60-00-4, EDTA, processes 64-19-7, Acetic acid, processes 77-92-9, Citric acid, processes 78-90-0, 1,2-Propanediamine 79-14-1, Glycolic acid, processes 87-69-4, Tartaric acid, processes 99-14-9, Tricarballylic acid 107-15-3, Ethylenediamine, processes 109-76-2, 1,3-Propanediamine 110-15-6, Succinic acid, processes 123-54-6, Acetylacetone, processes 144-62-7, Oxalic acid, processes 6915-15-7, Malic acid
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(ligand; used in manufacture of metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst**)

IT **7439-88-5**, **Iridium**, uses **7440-02-0**, **Nickel**, uses **7440-06-4**, **Platinum**, uses **7440-18-8**, Ruthenium, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst**)

IT **1333-74-0P**, **Hydrogen**, preparation **7782-44-7P**, **Oxygen**, preparation
RL: **IMF (Industrial manufacture)**; **PREP (Preparation)**
(metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst** for manufacture of)

IT 57-55-6, Propylene glycol, uses 64-17-5, Ethanol, uses **67-56-1**
, **Methanol**, uses 67-63-0, Isopropanol, uses 71-36-3,
Butanol, uses 107-21-1, Ethylene glycol, uses 7732-18-5, Water, uses
25265-75-2, Butylene glycol
RL: **NUU (Other use, unclassified); USES (Uses)**
(solvent; in manufacture of metal (oxide)-supporting layered structure
substance containing alkali metal and Group VB element as photclysis
catalyst)
IT **7722-84-1, Hydrogen peroxide**, uses
RL: NUU (Other use, unclassified); USES (Uses)
(aqueous, solvent; in manufacture of metal (oxide)-supporting layered
structure
substance containing alkali metal and Group VB element as photolysis
catalyst)
RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)

HO—OH

IT **7439-88-5, Iridium**, uses **7440-02-0**,
Nickel, uses **7440-06-4, Platinum**, uses
7440-18-8, Ruthenium, uses
RL: **CAT (Catalyst use); USES (Uses)**
(metal (oxide)-supporting layered structure substance containing alkali
metal and Group VB element as photolysis **catalyst**)
RN 7439-88-5 HCAPLUS
CN Iridium (CA INDEX NAME)

Ir

RN 7440-02-0 HCAPLUS
CN Nickel (CA INDEX NAME)

Ni

RN 7440-06-4 HCAPLUS
CN Platinum (CA INDEX NAME)

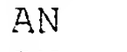
Pt

RN 7440-18-8 HCAPLUS
CN Ruthenium (CA INDEX NAME)

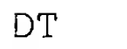
Ru

IT **1333-74-0P, Hydrogen**, preparation **7782-44-7P**,
Oxygen, preparation
RL: **IMF (Industrial manufacture); PREP (Preparation)**
(metal (oxide)-supporting layered structure substance containing alkali
metal and Group VB element as photolysis **catalyst** for manufacture

of)
RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)



RN 7782-44-7 HCAPLUS
CN Oxygen (CA INDEX NAME)



IT **67-56-1, Methanol**, uses
RL: **NUU (Other use, unclassified); USES (Uses)**
(solvent; in manufacture of metal (oxide)-supporting layered structure substance containing alkali metal and Group VB element as photolysis **catalyst**)
RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

L42 ANSWER 8 OF 8 HCAPLUS COPYRIGHT 2008 ACS on STN
AN 1996:494189 HCAPLUS
DN 125:119314
TI Method of producing off-**gas** having a selected ratio of carbon monoxide to **hydrogen**
IN Li, Lixiong; Gloyna, Earnest F.
PA Board of Regents, the University of Texas System, USA
SO PCT Int. Appl., 56 pp.
CODEN: PIXXD2
DT **Patent**
LA English
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 9619412	A1	19960627	WO 1995-US16414	19951214 <--
	W: AL, AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK				
	RW: KE, LS, MW, SD, SZ, UG, AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG				
	US 5578647	A	19961126	US 1994-359467	19941220 <--
	AU 9644250	A	19960710	AU 1996-44250	19951214 <--
PRAI	US 1994-359467	A	19941220 <--		
	WO 1995-US16414	W	19951214 <--		

AB A method of producing an off-**gas** with a selected **CO**/**H2** ratio of .apprx.0.1-8 and a **CO/CO2** ratio of .gtorsim.0.1 by hydrothermal processing is provided. The method comprises the step of contacting a reactant capable of producing **CO** and **H2** under hydrothermal conditions at a temperature of .gtorsim.374° and a pressure of .gtorsim.22.1 MPa in the presence

of water and with an amount of an additive effective to produce the selected **CO/H2** ratio. The contacting is for a time sufficient to produce off-**gas** having the selected **CO/H2** ratio and having a **CO/CO2** ratio of .gtorsim.0.1. Presence of the additive may enhance or reduce the ratio of carbon monoxide to **hydrogen** in the off-**gas**. The additive may be an acid, a base, a salt, an oxide, or an oxidant. The off-**gas** having a selected **CO/H2** ratio may be used for synthesis of organic compds.

IC ICM C02F0001-72
ICS C02F0011-06; C02F0011-08; C07C0027-10; C07C0027-12; C07C0067-39; C07C0031-20

CC 51-11 (Fossil Fuels, Derivatives, and Related Products)
Section cross-reference(s): 45, 60, 61

ST offgas selected carbon monoxide **hydrogen** ratio; synthesis **gas** manuf hydrothermal process

IT Oxidizing agents
(additives; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)

IT Acids, uses
Alkali metal hydroxides
Alkaline earth hydroxides
Bases, uses
Hydrogen halides
Oxides, uses
Salts, uses
Transition metal oxides
RL: MOA (Modifier or additive use); USES (Uses)
(additives; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)

IT Zeolites, uses
RL: CAT (Catalyst use); USES (Uses)
(**catalysts** containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for alkane manufacture)

IT Transition metals, uses
RL: CAT (Catalyst use); USES (Uses)
(**catalysts** containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for ethylene glycol manufacture)

IT Paper
Plant
Wastewater treatment sludge
Wood
(feeds containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)

IT Hydrocarbons, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(feeds containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)

IT Alcohols, preparation
Alkanes, preparation
Alkenes, preparation
Carboxylic acids, preparation
RL: PNU (Preparation, unclassified); PREP (Preparation)
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for manufacture of)

IT Wastes
(organic, feeds containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
IT Carboxylic acids, preparation
RL: PNU (Preparation, unclassified); PREP (Preparation)
(esters, method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for manufacture of)
IT Fuels
(fossil, feeds containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
IT Group IIIA element chalcogenides
Group IVA element chalcogenides
RL: MOA (Modifier or additive use); USES (Uses)
(oxides, additives; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
IT Hydrocarbons, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(oxy, feeds containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
IT Fuel **gas** manufacturing
(synthesis **gas**, method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
IT 463-79-6, Carbonic acid, uses 1310-58-3, Potassium hydroxide, uses 1310-73-2, Sodium hydroxide, uses 7558-80-7, Sodium dihydrogen phosphate 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses 7697-37-2, Nitric acid, uses **7722-84-1**, **Hydrogen peroxide**, uses **7782-44-7**, **Oxygen**, uses 7785-87-7, Manganese sulfate 10043-35-3, Boric acid, uses 17341-25-2, Sodium ion(1+), uses
RL: MOA (Modifier or additive use); USES (Uses)
(additive; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
IT 1308-38-9, Chromia, uses 1314-13-2, Zinc oxide (zno), uses 1344-28-1, Alumina, uses **7440-50-8**, **Copper**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(**catalysts** containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for alc. manufacture)
IT 7439-91-0, Lanthanum, uses 7440-00-8, Neodymium, uses **7440-02-0**, **Nickel**, uses 7440-10-0, Praseodymium, uses 7440-19-9, Samarium, uses 7440-29-1, Thorium, uses 7440-45-1, Cerium, uses 7440-53-1, Europium, uses 7440-58-6, Hafnium, uses 7440-61-1, Uranium, uses 7440-65-5, Yttrium, uses 7440-67-7, Zirconium, uses 7440-70-2, Calcium, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(**catalysts** containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for alkane manufacture)
IT **630-08-0P**, Carbon monoxide, preparation **1333-74-0P**, **Hydrogen**, preparation
RL: **PNU (Preparation, unclassified)**; **PREP (Preparation)**
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
IT 64-19-7P, Acetic acid, preparation **74-82-8P**, **Methane**,

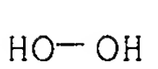
preparation 107-21-1P, Ethylene glycol, preparation 108-05-4P, Vinyl acetate, preparation
RL: **PNU (Preparation, unclassified)**; **PREP (Preparation)**
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for manufacture of)

IT **67-56-1P, Methanol**, preparation
RL: **PEP (Physical, engineering or chemical process)**; PNU (Preparation, unclassified); **RCT (Reactant)**; PREP (Preparation); **PROC (Process)**; **RACT (Reactant or reagent)**
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal treatment)

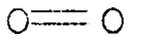
IT 50-00-0, Formaldehyde, reactions 64-18-6, Formic acid, reactions 87-69-4, Tartaric acid, reactions 111-48-8, Thiodiglycol 144-62-7, Oxalic acid, reactions 756-79-6, Dimethyl methylphosphonate 993-13-5, Methylphosphonic acid
RL: PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal treatment)

IT **7722-84-1, Hydrogen peroxide**, uses
7782-44-7, Oxygen, uses
RL: MOA (Modifier or additive use); USES (Uses)
(additive; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)

RN 7722-84-1 HCAPLUS
CN Hydrogen peroxide (H2O2) (CA INDEX NAME)



RN 7782-44-7 HCAPLUS
CN Oxygen (CA INDEX NAME)



IT **7440-50-8, Copper**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(**catalysts** containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for alc. manufacture)

RN 7440-50-8 HCAPLUS
CN Copper (CA INDEX NAME)

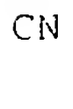
Cu

IT **7440-02-0, Nickel**, uses
RL: **CAT (Catalyst use)**; **USES (Uses)**
(**catalysts** containing; method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for alkane manufacture)

RN 7440-02-0 HCAPLUS
CN Nickel (CA INDEX NAME)

Ni

IT **630-08-0P**, Carbon monoxide, preparation **1333-74-0P**, **Hydrogen**, preparation
RL: **PNU (Preparation, unclassified)**; **PREP (Preparation)**
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing)
RN 630-08-0 HCAPLUS
CN Carbon monoxide (CA INDEX NAME)



RN 1333-74-0 HCAPLUS
CN Hydrogen (CA INDEX NAME)

IT **74-82-8P**, **Methane**, preparation
RL: **PNU (Preparation, unclassified)**; **PREP (Preparation)**
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal processing for manufacture of)
RN 74-82-8 HCAPLUS
CN Methane (CA INDEX NAME)

IT **67-56-1P**, **Methanol**, preparation
RL: **PEP (Physical, engineering or chemical process)**; PNU (Preparation, unclassified); **RCT (Reactant)**; PREP (Preparation); **PROC (Process)**; **RACT (Reactant or reagent)**
(method of producing off-**gas** having selected ratio of carbon monoxide to **hydrogen** by hydrothermal treatment)
RN 67-56-1 HCAPLUS
CN Methanol (CA INDEX NAME)

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L88 ANSWER 1 OF 5 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN
AN **2008-C88868** [21] WPIX
CR 2004-015138
DNC C2008-092263 [21]
DNN N2008-227391 [21]
TI Manufacture of hydrogen for fuel cell, involves desulfurizing hydrocarbon containing organosulfur-compound using oxidizing agent in static-type mixer, and modifying
DC E36; H04; H06; L03; X16
IN SAITO K
PA (IDEK-C) IDEMITSU KOSAN CO LTD
CYC 1
PIA JP 2007305595 A 20071122 (200821)* JA 9[0]
ADT JP 2007305595 A Div Ex **JP 2002-94913 20020329**; JP 2007305595 A JP 2007-159876 20070618
PRAI JP 2007-159876 20070618
JP 2002-94913 20020329
AB JP 2007305595 A UPAB: 20080331
NOVELTY - The hydrocarbon which contains organosulfur-compound is de-sulfurized by oxidizing agent in static-type mixer, and modified to obtain hydrogen.
DETAILED DESCRIPTION - The hydrocarbon is chosen from liquid petroleum gas, town gas, naphtha, gasoline, kerosene, light oil, fuel oil, asphaltene, oil-sand oil, coal liquid, petroleum type, heavy oil, shale oil, gas to liquid, waste-plastic oil and bio-fuel. The oxidizing agent is two or more type chosen from oxygen, air, nitrogen tetroxide, ozone, chlorine, bromine, meta-sodium periodide, potassium dichromate, potassium permanganate, chromic acid anhydride, hypochlorous acid, **hydrogen peroxide**, peracetic acid, **hydrogen peroxide**

and acetic acid, performic acid, the **hydrogen peroxide** and formic acid, meta-chloro perbenzoic acid, **hydrogen peroxide** and meta-chloro perbenzoic acid, fault chloroacetic acid, **hydrogen peroxide** and chloroacetic acid, fault dichloroactic acid, **hydrogen peroxide** and dichloroactic acid, fault trichloroacetic acid, **hydrogen peroxide** and trichloroacetic acid, fault trifluoroacetic acid, **hydrogen peroxide** and trifluoroacetic acid, fault meta-sulfonic acid, **hydrogen peroxide** and meta-sulfonic acid, **hydrogen peroxide** and salicylic acid, persulfuric acid, and **hydrogen peroxide** and sulfuric acid. The solvent in the solvent extraction is 2 or more groups chosen from acetonitrile, propionitrile, butyronitrile, nitromethane, nitroethane, nitro propane, nitrobenzene, dimethyl sulfoxide, N,N'-dimethylformamide, N,N'-dimethylacetamide, N-methyl pyrrolidone, trimethyl phosphoric acid ester, triethyl phosphoric acid ester, hexamethyl phosphoric acid amide, phosphorane, **methanol**, ethanol, propanol, butanol, water and acetone. The adsorption agent contains porous inorganic acid compound. The porous inorganic acid compound is 2 or more types chosen from silica, alumina, silica-alumina, zeolite, titania, zirconia, magnesia, silica-magnesia, clay, diatomaceous earth, activated carbon, and insoluble synthetic resin. The desulfurizing agent is catalyst having porous support and which contains nickel, silver, chromium, manganese, iron, cobalt, zinc, lead, iridium, platinum, ruthenium, rhodium, and gold. The support component of modification catalyst is 2 or more types chosen from manganese oxide, cerium oxide, and zirconia.

USE - For manufacturing hydrogen used for fuel cells.

ADVANTAGE - The method efficiently provides hydrogen.

L88 ANSWER 2 OF 5 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN
AN **2006-260057** [27] WPIX
CR 2006-282613; 2006-688604
DNC C2006-085030 [27]
DNN N2006-222429 [27]
TI Generation of hydrogen containing gas for fuel cells involves contacting liquid organic compound and liquid oxidizer in the presence of initiator at ambient pressure
DC E36; H06; L03; X16
IN NEMETH L T; OROSKAR A R; RAYNER C M; VANDEN B K M
PA (UNVO-C) UOP LLC
CYC 1
PIA US 7022306 B1 20060404 (200627)* EN 11[4]
ADT US 7022306 B1 **US 2003-395319 20030321**
PRAI **US 2003-395319 20030321**
AB US 7022306 B1 UPAB: 20060426

NOVELTY - A hydrogen containing gas is generated by contacting a liquid organic compound and a liquid oxidizer in the presence of an initiator at ambient pressure to produce the hydrogen containing gas.

USE - For generating hydrogen for use in chemical processes, or as a fuel for fuel cells and for automotive applications.

ADVANTAGE - The invention generates a hydrogen rich gas through autothermal reforming.

DESCRIPTION OF DRAWINGS - The figure is a schematic of the process for generating a hydrogen rich gas.

Reactor (10)
Inlet port (12)
Second reactor (20)
Second product stream (22)
Second product stream (32)

TECH
INORGANIC CHEMISTRY - Preferred Component: The initiator is catalysts, chemical initiators, or heat.
The organic compound is an oxygenate.
The oxidizer is **hydrogen peroxide**, organic **peroxides**, and/or hydroperoxides.
The oxygenate is alcohols, diols, triols, ethers, ketones, diketones, esters, and/or sugars. It can be **methanol**, ethanol, n-propanol, isopropanol, 1-butanol, 2-butanol, tert-butanol, 1-pentanol, 2-pentanol, 3-pentanol, tert-amyl alcohol, 1-hexanol, 2-hexanol, 3-hexanol, dimethylether, diethylether, isopropylether, methyl tert-butyl ether, methyl tertamyl ether, glucose, and/or sorbitol.
The oxidizer further comprises a diluent.
The catalyst comprises a decomposition catalyst for oxidizer decomposition and a reforming catalyst for reforming of the oxygenate.
The decomposition and reforming catalysts are in separate catalyst beds.
They comprise a mixture in a catalyst bed.
The process comprises a watergas shift catalyst or an oxidation catalyst for the conversion of carbon monoxide to carbon dioxide.
Preferred Process: The oxygenate and oxidizer are mixed in a mass ratio of 0.25-9.75 (0.7-3).
The hydrogen containing gas is purified.
The oxygenate and oxidizer are mixed prior to the step of mixing the mixture of oxygenate and oxidizer with an initiator.
INORGANIC CHEMISTRY - Preferred Component: The oxidizer is **hydrogen peroxide**.
The catalyst preferably comprises a metal from manganese, iron, vanadium, platinum, palladium, rhodium, rhenium, osmium, ruthenium, iridium, cobalt, copper, nickel, molybdenum, gold, and/or mercury.
The metal is dispersed on a support.
The support is an inorganic oxide from silicas, aluminas, titania, zirconia, yttria, carbon, silicon carbide, diatomaceous earth, clay, and/or molecular sieves.
The catalyst comprises a metal from The decomposition catalyst comprises a transition metal from vanadium, iron, cobalt, ruthenium, copper, nickel manganese, molybdenum, platinum, gold, silver, palladium, rhodium, rhenium, osmium, and/or iridium, preferably it comprises manganese(IV) oxide.
The reforming catalyst comprises a transition metal from chromium, gold, zinc, copper, platinum, silver, palladium, rhodium, rhenium, osmium, ruthenium, and/or iridium.
The catalyst comprises zinc oxide.
The water gas shift catalyst comprises at least one metal from iron, cobalt, nickel, copper, zinc, yttrium, zirconium, niobium, molybdenum, technetium, ruthenium, rhodium, palladium, silver, cadmium, lanthanum, hafnium, tantalum, tungsten, rhenium, osmium, iridium, platinum, gold, and/or mercury. It comprises copper and zinc oxide.
The oxidation catalyst comprises a metal from ruthenium, platinum, and/or gold.
Preferred Composition: The oxidizer is an aqueous solution comprising **hydrogen peroxide** concentration in 10-90 wt.%.
The gas has a hydrogen content greater than 5 wt.%.
The catalyst mixture comprises a ratio of the decomposition catalyst to the reforming catalyst in 0.1-10.
ABEX EXAMPLE - Pure ethanol was mixed with 30% aqueous hydrogen under atmospheric conditions. The mixture was oxidized using the catalyst manganese oxide. The test consisted of mixing 2 g pure ethanol with 2 g of 30% **hydrogen peroxide**. The reaction was very exothermic, and a large amount of gas was produced. The gas product composition comprised of 30 vol.% hydrogen, 22 vol.% carbon dioxide, and a

small amount of carbon monoxide. The liquid product composition included ethoxy-acetic acid and 2-propanol based on gas chromatography-mass spectroscopy.

L88 ANSWER 3 OF 5 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN
AN **2006-089523** [09] WPIX
DNC C2006-032287 [09]
DNN N2006-077818 [09]
TI Initiation of reaction between **methanol** and **peroxide** to produce gas involves contacting **methanol** and **peroxide** in liquid phase in the presence of catalyst having transition metal(s)
DC E36; L03; X16
IN XIAO T
PA (ISIS-N) ISIS INNOVATION LTD; (XIAO-I) XIAO T
CYC 107
PIA WO 2005075342 A1 20050818 (200609)* EN 24[0]
EP 1711431 A1 20061018 (200669) EN
KR 2006132893 A 20061222 (200742) KO
CN 1914116 A 20070214 (200746) ZH
US 20070167532 A1 20070719 (200749) EN
JP 2007522068 W 20070809 (200754) JA 14
ADT WO 2005075342 A1 WO 2005-GB401 20050204; CN 1914116 A CN 2005-80004024 20050204; EP 1711431 A1 EP 2005-708239 20050204; EP 1711431 A1 WO 2005-GB401 20050204; KR 2006132893 A WO 2005-GB401 20050204; US 20070167532 A1 WO 2005-GB401 20050204; US 20070167532 A1 US 2006-588156 20060801; KR 2006132893 A KR 2006-715797 20060804; JP 2007522068 W WO 2005-GB401 20050204; JP 2007522068 W JP 2006-551921 20050204
FDT EP 1711431 A1 Based on WO 2005075342 A; KR 2006132893 A Based on WO 2005075342 A; JP 2007522068 W Based on WO 2005075342 A
PRAI **GB 2004-2487 20040204**
AB WO 2005075342 A1 UPAB: 20060206
NOVELTY - A reaction between **methanol** and **peroxide** is initiated to produce a gas by contacting **methanol** and **peroxide** in the liquid phase and at a pressure equal to, below or above atmospheric pressure in the presence of catalyst having 7, 8, 9, 10 and/or 11 transition metal.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for an apparatus for carrying out a reforming reaction comprising storage mechanism containing **methanol** and **peroxide**; housing containing a catalyst having transition metal; and mechanism for introducing the **methanol** and the **peroxide** into the housing.

USE - For initiating a reaction between **methanol** and **peroxide** to produce gas, e.g. hydrogen, carbon dioxide, carbon monoxide, methane or oxygen (claimed).

ADVANTAGE - The invented method allows **methanol** and **peroxide** to be directly reacted together without initially having to heat them to a high temperature.

TECH
INORGANIC CHEMISTRY - Preferred Component: The **peroxide** is **hydrogen peroxide** which is in the form of an aqueous solution, alcohol solution or urea pellets having greater than or equal to6 vol.% **hydrogen peroxide**. The metal is nickel, cobalt, copper, silver, iridium, gold, palladium, ruthenium, rhodium or platinum. .The catalyst comprises catalyst promoters.
ORGANIC CHEMISTRY - Preferred Component: The **peroxide** is organic **peroxide**. The **methanol** and **peroxide** are present in a molar ratio of 2.5:1-1:3, preferably 1:1.
Preferred Method: The reaction comprises:
$2CH_3OH + H_2O_2 = 5H_2 + 2CO_2$;

2CH3OH + H2O2 = 2H2O + 2CO + 3H2;
CH3OH + H2O2 = CO2 + 2H2 + H2O;
CH3OH + 2H2O2 = H2 + CO2 +3H2O or
2CH3OH + 3H2O2 = CO2 + 5H2O.
The initiation is carried out without heating the reactants at less than 80, preferably less than 30degreesC. An organic feed, e.g. alcohol or hydrocarbon is reformed to produce a product stream having carbon dioxide, hydrogen and optionally carbon monoxide. Any carbon monoxide produced in the reforming step is converted into carbon dioxide by contacting the product stream with a water gas shift catalyst in the presence of water. The process is carried out in a fuel cell to power a rocket or to inflate an air, bag to pressurize mechanical equipment or for the quick start up of a catalytic exhausted gas converter or nitrogen oxide purifier.
ORGANIC CHEMISTRY - Preferred Component: The **peroxide** is **hydrogen peroxide** which is in the form of an aqueous solution, alcohol solution or urea pellets having greater than or equal to6 vol.% **hydrogen peroxide**. The metal is nickel, cobalt, copper, silver, iridium, gold, palladium, ruthenium, rhodium or platinum. The catalyst comprises catalyst promoters.
ABEX EXAMPLE - A reforming catalyst was prepared by impregnating manganese oxide catalyst support with an solution of palladium chloride. The impregnated support is then dried, calcined at 400degreesC and reduced in a flow of hydrogen gas at 400degreesC for 2 hours. A reformer is loaded with the reforming catalyst (0.25 g). A mixture of **methanol** and a 50% solution of **hydrogen peroxide** in water are fed into the reformer. A water gas shift catalyst (0.3 g) was placed downstream of the reforming catalyst. Analysis of the products showed water, hydrogen, methane and carbon dioxide as the products. The hydrogen yield was increased to 99%.

L88 ANSWER 4 OF 5 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN
AN **2005-526843** [54] WPIX
DNC C2005-160226 [54]
DNN N2005-430817 [54]
TI Modification method of hydrocarbon compound for fuel container of electric power generator, involves contacting mixture containing hydrocarbon-based compound, water and oxidizing agent, with catalyst
DC E36; H06; L03; X16
IN IGARASHI S; KAWAMURA Y; OGURA N
PA (CASK-C) CASIO COMPUTER CO LTD; (IGAR-I) IGARASHI S
CYC 1
PIA JP 2005200266 A 20050728 (200554)* JA 11[2]
ADT JP 2005200266 A **JP 2004-8062 20040115**
PRAI **JP 2004-8062** 20040115
AB JP 2005200266 A UPAB: 20051223
NOVELTY - The method involves contacting a mixture containing a compound comprising both carbon and hydrogen, water and an oxidizing agent, with a catalyst. The mixture is modified to form a product having hydrogen as main component.
DETAILED DESCRIPTION - The catalyst contains copper or platinum group element. The oxidizing agent is **hydrogen peroxide**
.
INDEPENDENT CLAIMS are included for the following:
(1) modifier (4);
(2) electric power generating apparatus (1); and
(3) fuel container (2).
USE - For fuel container used for electric power generating apparatus (both claimed).
ADVANTAGE - Modification method of hydrocarbon compound is performed efficiently, with reduced supply of heat energy. The formation

rate of carbon monoxide is low and the conversion rate is high.

DESCRIPTION OF DRAWINGS - The figure shows the block diagram of the modification method of carbon compound containing hydrogen for fuel cell-type electric power generating apparatus. (Drawing includes non-English language text).

electric power generating apparatus (1)
fuel container (2)
vaporizer (3)
modifier (4)
fuel cell (6)

ABEX EXAMPLE - A copper/zinc oxide catalyst was ground to form 0.25 ml of granules of diameter 0.5-1 mm and filled into a tubular type reactor of internal diameter 8 mm. The catalyst was subjected to hydrogen reduction processing at 300 degreesC for 1 hour. A mixture comprising **methanol**, water and 30 wt.% **hydrogen peroxide** solution in a molar ratio of 1:1.88:0.12 was prepared and circulated to the tubular reactor at a GHSV of 100000h-1. The conversion rate of **methanol** was 70.8% and the concentration of carbon monoxide in the product gas was 0.14%.

L88 ANSWER 5 OF 5 WPIX COPYRIGHT 2008 THE THOMSON CORP on STN
AN **2004-783586** [77] WPIX
DNC C2004-274065 [77]
TI Gas generation system for e.g. rocket propulsion; comprises liquid monopropellant comprising solution of **hydrogen peroxide**, alcohol and water, and iridium catalyst for providing rapid catalytic decomposition of the monopropellant solution
DC E11; E36; K04
IN GRIBBEN E S; LUNDSTROM N H; MARVIN M D
PA (ATLS-C) ATLANTIC RES CORP
CYC 1
PIA US 20040216818 A1 20041104 (200477)* EN 7[0]
ADT US 20040216818 A1 **US 2003-402139 20030331**
PRAI **US 2003-402139 20030331**
AB US 20040216818 A1 UPAB: 20050707

NOVELTY - A gas generation system comprises a liquid monopropellant comprising a solution of **hydrogen peroxide**, alcohol, water, and optionally a stabilizer; and an iridium catalyst for providing rapid catalytic decomposition of the monopropellant solution.

DETAILED DESCRIPTION - An INDEPENDENT CLAIM is also included for a gas generation method comprising combusting the inventive gas generant system.

USE - For generating gas such as carbon dioxide and water vapor (claimed) that are used for rocket propulsion, satellite propulsion, divert attitude control systems for interceptor missiles, and other power control systems where a re-start capability is desired.

ADVANTAGE - The system results in extremely rapid formation of gaseous reaction products. It provides rapid and repeatable decomposition of high water content **hydrogen peroxide**/alcohol solution. It contains inexpensive and commercially available oxidizer and fuel ingredients which can be readily and safely blended together and stored in one propellant tank.

TECH

INORGANIC CHEMISTRY - Preferred Components: The catalyst comprises iridium and at least one of ruthenium, iridium, palladium and platinum. The **hydrogen peroxide** is a water solution containing 60-90 (preferably 70) wt.% stabilized **hydrogen peroxide**. The catalyst is in the form of granules having a size of 14-18 mesh. The catalyst is deposited onto a porous carrier, which comprised a refractory.
ORGANIC CHEMISTRY - Preferred Components: The monopropellant is a class

1.3 one component liquid propellant formulation comprising a solution of stabilized **hydrogen peroxide**, alcohol, and water;
which when catalytically decomposed; forms gaseous products consisting of carbon dioxide, water vapor, and optionally a low concentration of oxygen or carbon monoxide. The liquid monopropellant comprises **methanol** and/or ethanol. It comprises an ethanol/water mixture, or a **methanol**/water mixture. The liquid monopropellant is catalytically decomposed on a supported or unsupported iridium-based catalyst. The stabilizer comprises tin in the form of an alkali metal stannate, nitrogen containing phosphonic acid, phosphonic acid, or organophosphonic acid. It comprises amino tris(methylenephosphonic acid) (ATMP), ethylenediamine tetra(methylenephosphonic acid) (EDTMP), and/or 1-hydroxyethyl-1,1-diphosphonic acid (HEDP).
CERAMICS AND GLASS - Preferred Materials: The refractory comprises alumina, silica, zirconia, clays, silicates, and/or aluminates.

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(FILE 'HCAPLUS' ENTERED AT 09:40:02 ON 07 APR 2008)
DEL HIS

FILE 'REGISTRY' ENTERED AT 09:40:11 ON 07 APR 2008
E METHANOL/CN
L1 1 S E3
E HYDROGEN PEROXIDE/CN
L2 1 S E3
L3 10 S (NICKEL OR COBALT OR COPPER OR SILVER OR IRIDIUM OR GOLD OR P
L4 5 S (HYDROGEN OR CARBON DIOXIDE OR CARBON MONOOXIDE OR METHANE OR

FILE 'HCAPLUS' ENTERED AT 09:42:22 ON 07 APR 2008
L5 1 S US20070167532/PN OR (US2006-588156# OR WO2005-GB401 OR GB2004
E XIAO/AU
E XIAO NAME/AU
E XIAO T/AU
L6 25 S E3,E4
E XIAO TIAN/AU
L7 76 S E3,E6
L8 77 S E16
E XIAO TI/AU
E TIAN/AU
L9 1 S E3
E TIAN C/AU
L10 59 S E3,E10
E TIAN CUN/AU
L11 2 S E5,E7
E TIAN NAME/AU
E TIANCUN/AU
E ISIS/CO
L12 3655 S E3-E104/CO,PA,CS
E E46+ALL
L13 441 S E2,E3/CO,PA,CS
L14 153216 S L1
L15 35966 S L14 (L) RACT+NT/RL
L16 2496 S L2 AND L14
L17 504 S L15 AND L16
L18 388 S L17 AND L2 (L) RACT+NT/RL
E PEROXIDE/CW,CT
L19 317 S L14 AND E3,E32,E33
E E33+ALL

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L20          3685 S L14 AND E6+NT
L21           831 S L15 AND L19,L20
L22          1378 S L20 AND E6+NT (L) RACT+NT/RL
L23          3685 S L17-L22
L24           429 S L23 AND L3
L25           214 S L24 AND L3 (L) CAT/RL
L26            28 S L24,L25 AND L4 (L) PREP+NT/RL
L27            18 S L25 AND L26
L28            10 S L26 NOT L27
L29             1 S L27 AND L5-L13
L30             3 S L27 AND PY<=2004 NOT P/DT
L31            11 S L27 AND (PD<=20040204 OR PRD<=20040204 OR AD<=20040204) AND P
L32            14 S L29-L31
L33             4 S L27 NOT L32
L34            14 S L4 AND L32
                  SEL AN 4 8 9 10 13 14 L34
L35             8 S L34 NOT E1-E12
L36             8 S L35 AND L5-L35
L37             8 S L35 AND (MEOH OR METHANOL OR PEROXIDE OR H2O2 OR HYDROGEN PER
L38             8 S L37 AND (H2 OR CO2 OR CH4 OR O2 OR HYDROGEN OR CARBON DIOXIDE
L39             8 S L38 AND L4(L)PREP+NT/RL
L40             7 S L39 AND L1(L)(USES+NT OR PROC+NT OR RACT+NT)/RL
L41             8 S L39 AND L3(L)(USES+NT OR PROC+NT OR RACT+NT OR CAT)/RL

     FILE 'HCAPLUS' ENTERED AT 10:05:46 ON 07 APR 2008
L42             8 S L39-L41
L43          2496 S L14 AND L2
L44           317 S L14 AND PEROXIDE?/CW,CT
L45          3685 S L14 AND PEROXIDES+OLD,NT/CT
L46          3685 S L43-L45
L47           919 S L46 AND L4
L48           172 S L47 AND L3
L49            25 S L47 AND TRANSITION METAL(L)?CATALY?
L50            53 S L48,L49 AND PY<=2004 NOT P/DT
L51            85 S L48,L49 AND (PD<=20040204 OR PRD<=20040204 OR AD<=20040204) A
L52           138 S L50,L51
L53           124 S L52 NOT L32-L41

     FILE 'WPIX' ENTERED AT 10:14:41 ON 07 APR 2008
                 E METHANOL/CN
L54             1 S E3
L55         27017 S R00270/DCN OR 0270/DRN
L56        116672 S MEOH OR METHANOL OR METHYLALCOHOL OR METHYL ALCOHOL
L57        124154 S L55,L56
                 E HYDROGEN PEROXIDE/CN
L58             1 S E3
L59         20258 S R01732/DCN OR 1732/DRN
L60          1198 S L57 AND L59
L61          4452 S L57 AND (PEROXIDE OR H2O2 OR HYDROGEN PEROXIDE OR HYDROGEN PE
L62          4565 S L60,L61
L63           326 S L62 AND ((A428 OR A427 OR A429 OR A547 OR A677 OR A679 OR A54
L64           158 S L62 AND (N02-B01 OR N02-C01 OR N02-D01 OR N02-E OR N02-E01 OR
L65            26 S L62 AND N06-F/MC
L66            99 S L62 AND (N07-B OR N07-C)/MC
L67            11 S (NICKEL OR COBALT OR COPPER OR SILVER OR IRIDIUM OR GOLD OR P
L68         22463 S (RA226A OR R03080 OR R07079 OR R05319 OR R03034 OR R07077 OR
L69           149 S L62 AND L68
L70           384 S L63-L65,L69
L71            47 S L70 AND L66
L72           436 S L66,L70,L71
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L73          350 S L72 AND (PD<=20040204 OR PRD<=20040204 OR AD<=20040204)
L74           69 S L73 AND C01B/IPC,IC,ICM,ICS
L75            8 S L73 AND (E31-A02C OR E31-D01 OR E31-N05 OR E31-N05B1 OR E31-N
L76            3 S L73 AND E31-A01/MC
L77           10 S (HYDROGEN OR CARBON DIOXIDE OR CARBON MONOXIDE OR METHANE OR
                  SEL SDCN 6-10
                  EDIT /SDCN /DCN
L78        56840 S E1-E5
L79       103564 S (0323 OR 1066 OR 1423 OR 1532 OR 1779)/DRN
L80          140 S L73 AND L78,L79
L81          160 S L74-L76,L80
L82           13 S L81 AND N282/M0,M1,M2,M3,M4,M5,M6
L83           44 S L81 AND N523/M0,M1,M2,M3,M4,M5,M6
L84           52 S L82,L83
L85          108 S L81 NOT L84
                  SEL AN 1 2 4 10 L85
L86            4 S L85 AND E6-E9
L87            1 S L84 AND 2006-089523/AN
L88            5 S L86,L87

     FILE 'WPIX' ENTERED AT 10:47:33 ON 07 APR 2008

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7 april 2008